ROCKS and MINERALS

PUBLISHED MONTHLY

Edited and Published by PETER ZODAC

August 1943

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ROCKS and MINERALS PEEKSKILL, N. Y., U. S. A.

The official Journal of the Rocks and Minerals Association

Chips from the Quarry

Did You Spot the Error?

In last month's issue of ROCKS AND MINERALS we called attention to a glaring error which appeared on one page of the reading matter in the June issue. We wondered how many of our readers spotted it and suggested that they drop us a card pointing out the error. Out of 41 cards and letters received, only two had the correct answers and both writers were from Illinois—A. J. Alessi, of Lombard, and J. D. Haffner, of Carlyle. One writer, from Ohio, pointed out a word that had been incorrectly hyphenated. The remaining 38 thought a joke was being played on the readers and wanted to know what it was as they could find no error.

We were very glad to read the cards and letters sent in and to note the interest manifested by the writers. Perhaps the error was and still is so unnoticeable that we should have said nothing about it and no one would have been the wiser except the author in which it appeared.

The error appeared on page 167—*the picture is upside down!*

Wrote Mr. Alessi after pointing out the error: "The picture is sure a fooler as it looks O.K. both ways."

Fast Replying to An Ad!

Editor R & M:

Thanks a lot for the mention given me in the current (July) issue of ROCKS AND MINERALS which arrived today. I got a kick out of it. Before this issue arrived in which Estwing hammers are featured in my ad, a special delivery airmail arrived from Mr. C. S., of New York City, ordering one of them. That's fast replying to the ad and he gets the first hammer.

Pretty good when you get orders before you see your advertisement!

July 8, 1943 A. J. Alessi,
Lombard, Ill.

A Well-Balanced Magazine

We have had quite a number of replies to our editorial in last month's issue of ROCKS AND MINERALS in which we called attention to a reader's suggestion that the advertisements should appear in the front of the magazine instead of the last as at present. With one or two exceptions, every writer approved the present set-up. Here is a typical reply: "Leave your magazine as it is—you are doing a fine job, considering all that you are up against these war times." Walter E. Kuenstler, Cliffside Park, N. J.

Peter Zodac

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The Official Journal of the ROCKS and MINERALS ASSOCIATION

Whole No. 145

VIRGINIA'S GEOLOGIC RESOURCES IN WAR AND PEACE*

By ARTHUR BEVAN, State Geologist

Virginia Conservation Commission, Geological Survey

PROVIDE MATERIAL BASIS

This global war is fundamentally based upon and fought by the use of the geologic resources of the earth. The outer crust of the earth contains large stores of metals, mineral fuels, soils, other very useful mineral resources, and ground-water supplies. Without the materials supplied by the mineral industries, this or similar wars could never have been begun. The ebb and flow of this war in the various arenas is closely related to the supplies of raw materials for those industries. The war could last only a short time on the present scale if the production of most ores, mineral fuels, and other geologic materials were sharply curtailed. As the tides of war thus far have plainly indicated, ultimate military victory will be won by those nations which have been most amply endowed with the indispensable mineral resources and which use them most effectively... The course of events during the past half century has also plainly indicated to all those who are willing to study and comprehend our inescapable geologic inheritance and environment that the trends of peace will be no less affected by the use of those same mineral resources, both in the various national economies and in international commerce.

After the War

After the war, man will be even more dependent on mineral resources, despite the greatly increased use of products synthesized by the chemical industries. Most of those chemical products have ultimately a geologic base. Even with greatly increased substitution as time passes, critical shortages of certain ores, petroleum, and other resources are inevitable. A material tragedy of this war is the constantly accelerating pace at which irreplaceable mineral commodities are being destroyed. All of the raw mineral resources used by war industries were made eons ago by certain geologic processes—and nature no longer is making most of them on a scale that will be useful to man. From any point of view, the long-continued, insatiable raids of modern war upon the definitely limited mineral resources inheritance of all men for all time is one of the most essential factors to be properly adjudicated in all conferences on future national and international relations.

Against this general background of the essentiality of most geologic resources and the rapid depletion of many of them by modern, all-out, global warfare, what is the role of Virginia's geologic resources in this war and what use can be made of them after the war ends?

Virginia is fortunately located geographically and blessed by geologic inheritance. She is in a position to contribute much to the wartime needs and the peacetime opportunities of her citizens and of the nation, and in turn to the peace and welfare of many parts of the world. Her geologic inheritance and environment are among the best. True, certain resources are scant or lacking but

*University of Virginia *News Letter*, June 1, 1943.

others are here in great abundance. The climatic relations are strategic for the development of these resources. A diversified topography—sea level to high plateaus and mountain summits—provides ready access to many of the resources stored below Virginia's soils, which otherwise might long have remained undiscovered and unused. The topography of the State also facilitates the production and ready marketing of numerous diversified commodities—both factors of high importance during the demands and stresses of wartime. In peacetime, they may make the difference between the industrial use or non-use of certain raw materials. By no means of least importance to the residents of Virginia, and to visitors, is the fact that the geologic features and resources provide abundant opportunities for that recreation and esthetic appreciation which are even more essential in times of war than in times of peace.

Useful In Industry

Some of the geologic resources which are most useful to industry and to meet the needs of the armed forces in the State can be evaluated neither in quality nor in quantity without specialized, detailed field study and solution of particular problems as they arise. Ground water, for instance, is a common-place geologic resource in this humid region, but to obtain millions of gallons a day of it for an industrial plant, a municipality, or some establishment of the armed forces requires a thorough consideration of numerous geologic factors. An evaluation of those factors must then result in the local application of specific geologic principles.

A brief sketch of the general character and relations of Virginia's geologic resources should make more readily evident some of the problems in locating and developing these resources of the needed quality and quantity under the stress of wartime demands. It will aid also in envisioning some of the steps that must be taken to put this phase of Virginia's economy on a sound footing to meet the peacetime needs of post-war industrial developments.

The stage set by the successive events of a geologic history that spanned more than a billion years in the creation of Virginia's resources is in general relatively simple. Only in the detail necessary for technical determinations is it quite variable and complex.

About one-fifth of the State lies in the Atlantic Coastal Plain—a region underlain by almost horizontal beds of loosely consolidated sand, green-sand, clay, and marl, locally veneered by loose sand and gravel. Some of these materials are important for both wartime and peacetime use, particularly in the manufacture of Portland cement and in general construction work. The clays are used at several places in the manufacture of brick and similar products. Green-sand and marl are used to condition the soils, which are well drained but none too fertile. The lack of limestone in the Coastal Plain retards the very desirable liming of many of the soils, although raw shell marl is used on some farms. Metallic ores and mineral fuels are also lacking in Tidewater Virginia. Sandstone from Aquia Creek was used to build several Federal buildings, the Richmond public library, and on the Mt. Vernon estate.

Other Uses of Resources

Other military and civilian uses of these geologic resources are not so evident. Many of the deeply buried sands are water bearing. The intake area of these sands lies along the western border of the Coastal Plain where the edges of the slightly inclined beds are exposed to rainfall. Eastward, the fresh water moving seaward through the sands is sealed in by the overlying impermeable clays. The alternation of these sands and clays having a gentle seaward dip constitutes a geologic environment that solely makes it possible to obtain in certain places the huge supplies of artesian water which are needed daily by numerous units of the armed forces in Tidewater Virginia as well as by industries and municipalities in times of war and peace. A single industrial well, for example, is yielding 3½ million gallons of water a day.

The gently seaward-sloping surface of the region has been deeply trenched by five major rivers, then lowered with respect to sea level until the deeper valleys have been drowned by the sea and converted into bays and estuaries, such as Chesapeake Bay and Hampton Roads. The naval and military significance, as well as the effect on peacetime transportation, of these profound geologic changes is obvious. The geologically rather recent drowning of the major valleys and their tributaries, as exemplified by Chesapeake Bay and its embayed shores, has produced also the geologic environment for the establishment of the sea-food industry and recreational facilities of Tidewater Virginia. The wash of waves and the sweep of winds have built up the beach from Cape Henry south to Back Bay and beyond and also the stubby peninsula upon which Fort Story is situated.

A Region of Diversity

Piedmont Virginia, to the west, is separated from Tidewater Virginia, to the east, by a narrow belt—the Fall Zone—of falls and rapids along the major rivers. The Fall Zone had a marked influence upon the early colonial exploration and expansion of Virginia. It was a determining factor in the location of Richmond, Petersburg, Fredericksburg, and Washington, D. C., as well as numerous other eastern cities. Those responses to geologic conditions have been of vital State and national importance for more than two centuries.

Piedmont Virginia is a region of great geologic diversity and complexity. As it comprises more than two-fifths of the area of the State, its geologic resources are of considerable interest. The foundation rocks are chiefly crystalline types of many kinds, of which granite is perhaps the best known. Here and there are basins which contain sandstone and shale, with bituminous coal in the Richmond and Farmville basins. Many of the crystalline rocks were emplaced in a molten state, having risen from the depths of the earth's crust. They carried in solution numerous minerals of economic value that were deposited in veins and dikes and as scattered masses and disseminated grains through the "country rock."

The stage of the Piedmont region was set for the utilization of these mineral resources by a series of great geologic events. The hard rocks were folded and upheaved to great heights, being severely fractured during the deformation. Then the region was eroded to a plain, the present surface of the flattish uplands. That plain was uplifted, so that the rejuvenated streams have been dissecting it into the maze of the Piedmont hills and valleys. During the long-continued, deep erosion, the now available geologic resources of the Piedmont region were either uncovered or formed.

Of Commercial Value

Some two dozen geologic materials in Piedmont Virginia have commercial value in normal times. A few of them are particularly useful to war industries. The chief metals of which ores occur in this part of the State are copper, gold, iron, manganese, titanium, and zinc. Most of them were carried to their positions in the host rocks by molten solutions that rose from the depths; hence they are associated with the crystalline rocks. Some of the ores were formed by other geological processes.

Copper was formerly mined in Halifax County. Under the stimulus of the urgent war need for a greater immediate production of copper, intensive investigation of those copper-bearing rocks is in progress. Gold in Piedmont Virginia is not of current interest. Iron was formerly mined at several places in the western and southern parts of the region. Some attention has been given recently to some of the larger deposits but no mining is being done. Manganese occurs in a belt between Howardsville and Altavista. A large tonnage was once produced from a few mines. The area has recently been surveyed in detail. Titanium ores, essential in the manufacture of steel and other products, are mined in Amherst and Nelson counties and treated in two large modern mills, in amounts that add much to the nation's wartime supply. During peacetime the Roseland

mine produced most of the world's supply of a certain titanium ore. Zinc mining has recently been resumed in Spotsylvania County.

Nonmetallic mineral resources that are being mined and quarried in the Piedmont region include barite, clay, coal, feldspar, kyanite, limestone, mica, a phosphate-bearing mineral, stone of several kinds, and talc. Emery was once mined in Pittsylvania County. The large bodies of pyrite in Louisa County and smaller ones in Prince William County were mined in the early part of this century and during World War I. Graphite has been prospected in several places and mining attempted in Albemarle County but without commercial production. Gem minerals from the Amelia Courthouse area, "fairy stones" from Patrick County, amethyst in a few localities, and turquoise at one place have added to the general interest in the minerals of Piedmont Virginia.

Mica of Prime Interest

Mica now holds the prime interest in Piedmont mineral resources because it ranks next to the top among the critical minerals needed in the prosecution of the war. It is found in several of the counties, with prospecting centered mainly in the Amelia and Ridgeway areas. Kyanite, an aluminum silicate, is being mined "around the clock" in Prince Edward County. The other mineral resources named above are produced locally in variable amounts. Of them, feldspar is probably the most important, both for peace and war uses.

Piedmont Virginia contains some rather unique kinds of stone as well as an abundance of common varieties that bulk large in the State's production of mineral resources. A peculiar greenstone at Lynchburg makes a beautiful architectural stone that is in much demand during normal times. Granite is abundant. It was formerly quarried extensively in the Richmond-Petersburg district and is still quarried at other localities. The Buckingham slate has been well known and much used for more than a century. Other slate deposits are also quarried. The Albemarle-Nelson counties area contains one of the largest commercial deposits of soap-stone in the world. Trap rock—a dense, hard lava—is quarried at many places for construction stone.

Slow penetrating decay by air and water during hundreds of thousands of years changed the outer parts of the Piedmont rocks into a mantle of soil which contained the mineral plant foods from those rocks and humus from the universal cover of decaying vegetation. Then man came, cleared the land, and tilled the age-old soil irrespective of the contour of the slopes and with scant attention to the maintenance of fertility or even the retention of the soil. The results are all too evident—man in less than two centuries has irreparably damaged the most valuable geologic resource that required a thousand centuries for its making. The good soil has been washed away from many Piedmont slopes as effectively as though man had scraped the hills and dumped the soil into the nearest rivers. The remaining surface material is low in organic matter and so devoid of many essential plant foods that both mineral fertilizers and ground limestone must be liberally applied to produce the yield of crops to meet the urgent demands of wartime or even the real needs of peacetime.

Ground Water Supply

In many places the Piedmont crystalline rocks are so devoid of pores and crevices that the ground water moves too slowly to yield an abundant supply when wells are drilled. The finding of sites where municipalities, industries, and even large property owners can obtain an adequate supply of ground water is a perplexing geologic problem. The problem is made more troublesome because the ground-water geology of only a meager part of the Piedmont region has yet been studied. Many deep, dry holes have been drilled by towns and industries, at considerable expense.

The chief geologic resources of the Blue Ridge province are its scenery and its recreational features. The mineral deposits include the metals copper, gold,

iron, manganese, nickel, and tin. Copper ores were mined in the 1850's in the southwestern part. War needs have renewed exploration in that district. Gold was mined at one place. Iron ore was once extensively mined from thick beds near the crest of the Blue Ridge in Bedford, Botetourt, and Roanoke counties. The other metallic mineral deposits have been prospected but no commercial mining has been done.

The nonmetal of greatest immediate interest is quartz crystal, for it is indispensable for maintaining frequency in radio transmission. It is thus the most critically needed war mineral. None that meets the rigid specifications has yet been found in Virginia, but deposits in Floyd County are being tested. Pyrrhotite, a compound of iron and sulphur, has long been mined northwest of Galax for the manufacture of sulphuric acid at Pulaski.

Of First Magnitude

The Valley part of Virginia contains about one-fourth of the area of the State. Its fame rests largely on the products of its fine soils and on its superb scenic features, among which several of the diverse natural wonders have international renown. All are geologic resources of the first magnitude.

The Valley is noted also for the abundance of high-grade limestone, which makes Virginia one of the leading states in the nation in the production of limestone and its products. The huge deposits of dolomite, a compound of magnesium, have potential use in the postwar manufacture of the light weight metal, magnesium. The salt and gypsum deposits in the southwestern part have long been productive and the basis of important chemical industries. Cement rock is abundant. It is used in one place for the manufacture of Portland cement. Clays and shales for the manufacture of brick and similar products are plentiful. A large ocher industry operates southeast of Pulaski. Glass sand is produced in western Frederick County. The sole black marble industry in the eastern United States is at Harrisonburg. Barite and a few other nonmetallic resources are mined and quarried in various parts of the Valley.

The Valley contains extensive deposits of several metallic ores, including the aluminum ore bauxite, iron, lead, manganese, and zinc. Bauxite is mined in Augusta County. Large deposits of iron ore remain unmined in Alleghany, Botetourt, and Craig counties, even though much ore was mined here and elsewhere in the Valley. The Crimora manganese mine in Augusta County was once the largest producer of manganese in the nation. Many other mines have operated through the length and breadth of the Valley. Ore is being mined today in several counties. Lead and zinc are produced from a large mine in Wythe County.

Mineral Fuels

The mineral fuels—coal, natural gas, and petroleum—have been found in the southwestern part of the Valley. Hard coal has long been mined in Montgomery and Pulaski counties. Natural gas was commercially produced northwest of Bristol.

The ground-water supplies of the Valley are a most important geologic resource, for municipal, industrial, and domestic use. The relations are too complex to discuss here. It should be noted that, although several of the largest industries depend upon ground waters, adequate supplies of the right quality can not be found everywhere.

The southwestern plateau region includes only one twenty-fifth of the State's area, but the annual value of its produced mineral resources is commonly half of the total annual value in the State which amounts to approximately $50,000,000. Coal is the valuable resource. All of the counties west of the Valley have large deposits of high-grade bituminous coal. Reserves were estimated about 1920 to be some 21,000,000,000 tons. The annual rate of mining is ten to twelve million short tons. No doubt the output of more than 13,000,000 tons from 112 mines in 1939 will be much exceeded in the effort to meet wartime needs.

AMERICA'S FIRST MINERAL COLLECTION*

The first mineral collection formed in America was made in the 1790's by Dr. Adam Seybert of Philadelphia. This "beginning of mineralogy" in the United States contains 1725 specimens of rocks and crystals. In the original cabinet Dr. Seybert had built for it, and as he arranged it, it is in the Academy of Natural Sciences of Philadelphia, as is the original catalog.

The collection marks the beginning of the Academy. On the evening of January 25, 1812, the founders met in John Speakman's apothecary shop, odorous with camphor, rhubarb and musk, at Second and High (now Market) Streets. In anticipation of the organization of the Academy, Mr. Speakman had purchased the Seybert collection for $750, a large sum in those days. Shares of $20 were issued to reinburse him for the expenditure, and the effort to honor this indebtedness helped to keep the Academy group together.

Soon after the formal organization of the institution on March 21, 1812, a small room was hired at 121 North Second Street. There the collection was installed and Dr. Gerard Troost, a Hollander and first president of the Academy, delivered a course of lectures on mineralogy.

Dr. Seybert was America's first mineralogist. While a student in Paris and Goettingen, he had accumulated a fine mineral collection, into which he incorporated the specimens described in his "Catalogue of some American minerals which are found in different parts of the United States."

Some idea of the importance of this pioneer collection may be gained from the fact that a few years prior to its purchase for the Academy, Benjamin Silliman, newly appointed Professor of Chemistry and Natural History at Yale College, had journeyed by stage-coach from New Haven to Philadelphia to see the Seybert collection. On arriving in Philadelphia he lodged at Mrs. Smith's, whose house, occupying the triangle at Dock and Walnut Streets, was frequented by Connecticut members of Congress and by Robert Hare, Horace Binney, John Sargent, George Vaux and Elihu Chauncey.

Silliman had brought with him in a small candle box the entire mineral collection of Yale College—a lot of unlabeled stones. Box under arm, he trudged past the markets of High Street to the shop of Seybert, chemist and mineralogist, at 168 North Second Street, to have them identified. And he went back with the desired information.

In Seybert's catalogue forty different minerals in the collection were described. He told of a "radiated zeolite found investing hornblende rock, on the canal near the river Schuylkill, about three and a half miles from Philadelphia." Further, "I have some specimens of marble found in York County, which approach those allowed to be the pride of Italy." He announced, in 1806, the occurrence of "sulphuret of zinc" (zinc blende) near the Perkiomen Creek, in Montgomery County, and demonstrated that it would yield zinc metal, resulting in the opening of the Perkiomen mines.

Most of the specimens, however, are from Europe. They are small in size, and single crystals are neatly mounted on small wooden plaques. All are ticketed with numbers referring to the manuscript catalogue.

Noteworthy is a specimen of celestite, the sulfate of strontium, a species first described from Blair County, Pennsylvania. There are specimens from the mines of Cornwall, England—some of which have not been worked for 150 years; Iceland spar from Iceland; two specimens of cryolite from Greenland, now famous as a strategic mineral used in processing aluminum; "elastic sandstone" from Brazil, and spinel and silicates in blocks of limestone ejected by Vesuvius.

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* Reprinted by permission from the June, 1943, issue of *Frontiers*, the magazine of the Academy of Natural Sciences of Philadelphia, Penn.

SEEING OPAL IN THE PROCESS OF FORMATION

By MARK M. FOSTER

After having spent two winters (winter being the rainy season) in the Nevada opal fields, it is with pleasure I have observed opal in the process of formation.

I observed the first stage of opal formation on the dump, where pools of rain water had collected; the dump contained bentonite, a hydrous complex aluminum silicate formed by an alteration or decomposition of volcanic ash.

A colloidal jelly forms in the pools of water on the dump. After a long period the earth beneath the water becomes saturated, the water filtering down through the paths of least resistance and continues to release the elements which compose this colloidal jelly. Once released, the colloidal jelly remains segregated from the bentonite and is deposited in the capillaries and voids in the earth where after a summer of dry season it becomes set and much harder than bentonite. As the colloidal jelly has a high silica content, it will continue to harden from year to year until it matures as opal.

There is buried in the bentonite beds of the opal field, wood, in many stages of petrification, some, from all physical appearances, has never petrified. This latter lies in loosely coherent acicular fibers held together only by the pressure of the bentonite matrix around it. The wood body seems to have parted with the elements which held it together *as wood*. The moment such wood is removed from place, it falls apart becoming a mass of loose fibers.

I decided to sink a shaft somewhat deeper this spring, in the bentonite, which had partially filled up with rain water and bentonite sloughed from walls for several months. The water in the shaft had much time to release the colloidal jelly and deposit it in cracks and voids in the hard undug earth below. As I progressed downward with the shaft, I observed in the damp walls, new and still wet deposits of the colloidal jelly in the cracks and voids and as it is the nature of water to seep around rocks, there was also a coating of the jelly around the woods in the walls.

As I gained depth in the shaft, I soon encountered dry bentonite and began to observe cracks and voids which, perhaps many years ago, had been filled with the colloidal jelly which by now had become quite hard—say 4 points in hardness—resembling our moss or dendritic opal, yet opaque.

Sinking deeper I observed that the fibrous wood began to carry a thin outer coating of glass-clear to fire opal and had better power of cohesion, but yet delicate and when pulled apart had streaks of very thin fire opal within. In the ledges of the common opals in the field here, moss opal, jasp-opal, etc., I find the same immature opal, as mentioned above, having about 4 points hardness. Since Dr. Chester A. Arnold came out with a theory that wood petrifies by infiltration rather than the orthodox theory of molecule by molecule replacement, my opinion is, based on observation only, that this fibrous wood never was petrified but has been preserved *as wood* and wood in that state would form an ideal filter for purifying and clarifying the silica which forms the opal. I must confess that while I am a raw recruit in mineralogy, this paper is not set up as a "forgone conclusion" but merely as an amateurish field observation.

I have been told that following the disturbance which built the volcanic ash bed here, there was a time when the annual rain fall amounted to 400 inches which supplied plenty of water to produce the opal. With the present dry climate, the formation of opal is only very feebly going on as bentonite is very hard to saturate and there are no ponds or lakes to hold water.

Editor's Note: The above observations were made in the Virgin Valley area of Nevada.

KERN RIVER GEOLOGICAL EXCURSION

A most successful four-day geological excursion through the Kern River area of southern California was completed on May 17th, 1943, by a group of 76 persons (in 19 cars) under the leadership of Mr. Edwin V. Van Amringe, of the Pasadena Junior College faculty.

Friday, May 14th

The caravan left Pasadena, Calif., on Friday, May 14th, heading northward. The first day the party (consisting of students of geology at Pasadena Junior College, accompanied by some members of the Mineralogical Society of Southern California) toured the gorges of San Gabriel Mountains in central Los Angeles County. Camp was made for the night at picturesque Red Rock Canyon, in eastern Kern County.

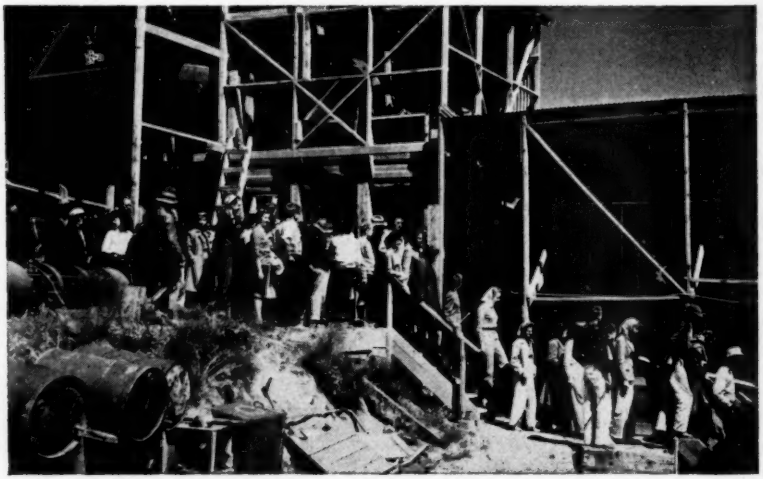
Saturday, May 15th

Early in the morning the caravan traveled over Walker Pass, and paid a visit to the custom tungsten mill at Weldon, in northern Kern County, where the collectors secured interesting scheelite and garnet specimens. Beautiful banded marble outcrops in enormous beds nearby and these were examined and specimens collected.

A side trip along the picturesque Kern River led to the historic ghost town of Keysville, in northern Kern County, which between 1854 and 1858 was the most active gold camp in California south of the Mother Lode.

The afternoon was spent with Dr. J. W. Prout and his brother, mining geologists, and James Jorgensen, mine superintendent, at the famous Big Blue gold mine north of Kernville in northern Kern County. The Big Blue mine was discovered in 1860 when "Lovely" Rogers picked up a chunk of quartz to throw at his straying mule and found it heavy with gold. Since then the old mine has been operated almost continuously and a vast new ore body had been blocked out at the time of the recent governmental closing order.

The group was permitted to make a complete field study of the area including the collecting of many rock and ore specimens and minerals and were further



Courtesy of Mineral Notes and News

Kern River Geological Excursion
The group at the tungsten mill in Weldon, Calif.
(Photo by Chas. L. Heald)

permitted to make an inspection of the combined flotation and amalgamation mill where the ores of the mine are processed. Dr. Prout also provided every member of the group with fine specimens of scheelite, stibnite, and native antimony from inaccessible nearby properties. This visit to the gold mine was the most interesting of the entire trip.

Camp was made for the night in the National Forest at Limestone Cliff, far up the Kern River, near Fairview in southeastern Tulare County.

Sunday, May 16th

The group went on a hike this day into the mountains to study the great Kern Canyon fault so ably described by Dr. Robert W. Webb, of U. C. L. A. A point of special interest was Packsaddle Cave where clear cut evidence of past and recent faulting was actually observable in the stalactites.

Camp for the night was at the same place, at Limestone Cliff.

Monday, May 17th

Before dawn the party was on the move again but homeward, part of the way down the Kern River and then over the beautiful Greenhorn Mountains to Woody, in northern Kern County, where a stop was made at the Greenback Copper Mine. Fine specimens of chalcopyrite, the chief ore of the mine, bornite, and other minerals were collected.

From Woody, a detour was made over the old Butterfield route, stopping for a brief time at the finely preserved Granite stage-station, and then on to Mt. Poso and Round Mt. oil fields in western Kern County. A moment was spent at the "Ocoya" (Poso) Creek locality, where the Pacific Railroad Survey party collected the first California Miocene fossils 90 years ago.

Shark Tooth Hill, in western Kern County, about 7 miles northeast of Bakersfield, was the last stopping place where, guided by the careful instructions of Mr. Paul VanderEike, of Bakersfield, Calif., everyone had luck in collecting fossil teeth, bones, and mollusc shells in abundance.

The weary though happy group reached Pasadena about midnight loaded down with many choice specimens as mementoes of a most enjoyable geological excursion.

GEOLOGIC FORMATIONS AND ECONOMIC DEVELOPMENT OF THE OIL AND GAS FIELDS OF CALIFORNIA

PREPRINTS OF PARTS ONE, TWO, THREE AND FOUR NOW RELEASED
(Parts Three and Four Under One Cover)

PRICE $4.00

Bulletin 118, "Geologic Formations and Economic Development of the Oil and Gas Fields of California" is now available in four preprint parts: Part one, Development of the Industry; part two, Geology of California and the Occurrence of Oil and Gas; part three, Descriptions of Individual Oil and Gas Fields; and part four, Glossaries, Bibliography, and Index, including Outline Geologic Map of California Showing Oil and Gas Fields and Drilled Areas, scale 1:1,000,000. Parts one and two are bound as separate volumes, parts three and four as one volume, all with paper covers. Price for the set: $4.00.

Bulletin 118 will undoubtedly stand for many years as the leading authority, not only on the oil and gas resources of California, but on the geological history of the entire State. It is a companion piece to the large colored Geologic Map of California, published in 1938 by the Division of Mines. Both map and bulletin have been prepared under the direction of Olaf P. Jenkins, Chief Geologist of the Geologic Branch of the Division of Mines. 126 authors have contributed to the bulletin. It is much larger than any hitherto published by the Division of Mines, page size being 8½″x11″, number of pages 773, and number of plates, figures, and other illustrations approximately 375.

Now that the entire bulletin is available, no new subscriptions will be taken at the original pre-publication $3.00 rate for four parts, to be supplied as issued. The final cloth-bound volume will contain all four parts of the bulletin (including state oil and gas map), and will sell for $6.00 when ready. Library and Exchange lists will be supplied from the bound volumes. Announcement will be made when this issue becomes available.

A REFERENCE COLLECTION OF MINERALS

By H. STANTON HILL
Pasadena Junior College
Pasadena, California

A dozen years ago the writer, then a college student and enthusiastic mineral collector, made the (to him) important decision that the field of geology and mineralogy was to be his life work, with the emphasis on mineralogy. Soon he began to realize that a mineralogist, as distinguished from a mineral collector, has a vast multitude of facts of many types to keep in mind if he is to become proficient in his field. The accumulation of these facts about minerals and mineral relationships proved to be a fascinating study and slowly the belief developed that if the minerals that were read about and studied could be owned personally in all their interesting variety, and arranged to illustrate the systematic portion of Dana's "Textbook of Mineralogy", a reference collection of high professional value would result. It was not overlooked that both the collection and the enjoyment in working with it would be endless.

It is obvious that in a collection of such scope the specimens must be small and more or less uniform in size. The writer determined a maximum specimen size of 1¼"x1½" for his collection and decided to place each one in uniform individual cardboard trays with openings of the above dimensions. The trays themselves are larger in one dimension (1¾"x1½"), as they are fitted with a label platform ½"x1½" on the observer's side (bottom edge). Their shallow depth (⅜") and white color show up the minerals to the best advantage. The label is printed, consisting of a plain blue-green border with three horizontal lines on which are lettered by hand the name, variety, formula, locality and sometimes other descriptive data. It is surprising how much information can be placed on a small label if one is neat and careful. Since it is visible at all times the specimens do not have to be handled.

Each specimen is numbered and recorded on a numerical accession list and a red check is placed in front of the mineral or variety name in Dana on the page where it is described. A card index of the collection is also kept. For each specimen there is a card containing the name, formula, crystal system, description, locality and source from which the specimen was obtained. The lower half of the card is reserved for notes on the results of chemical tests and optical and crystallographic measurements and for bibliographical references to the specific locality. In general the cards supplement the information given on the label.

The collection now consists of about 1,000 specimens representing 450 distinct minerals (counting all the varieties of quartz, for example, as just one mineral). All the common minerals are represented, some by many forms and diverse crystallizations. Several hundred might be termed "rare" and are seldom seen by the average collector. For some time these rarer minerals have been of especial interest to the writer and have furnished him much pleasure. It is possible that the restrained enthusiasm for rare minerals which he has noticed in more than one collector is due mostly to a lack of knowledge concerning the minerals, the want of an interesting background against which to set the mineral in his mind. It is a situation easily remedied by the reading of mineralogical books and magazines.

The small size of the specimens has rarely eliminated items from the collection, since nearly everything found in larger specimens may also be obtained small. Besides, the rarer minerals, either through occurrence or because of expense, are most easily obtained in small sizes. The great differences in specimen size found in most collections, a real problem when attempting an arrangement according to Dana, is lacking. Uni-

formity in size makes it possible to place the minerals in the correct order. The small diamond crystal, for example, is in the same size tray as the graphite and may be placed along side where it belongs. The smaller loose crystals and the powdery minerals and sands are in small vials.

The arrangement of a collection according to the system of Dana affords an excellent opportunity for learning the approximate or even the exact composition of the minerals. The collector soon learns to open the drawer labeled "Phosphates, Arsenates, Vanadates, etc." when looking for pyromorphite, for example, and it is not long before he remembers that such minerals as variscite, purpurite, and monazite are to be found in the same drawer as pyromorphite and apatite. The minerals which are closely related occur together and one can appreciate at one glance the beautiful little pyromorphite-mimetite-vanadinite series in which the crystals are almost identical in shape and habit due to the similarity of their composition. The labels show that pyromorphite is a lead-chlor-phosphate, mimetite a lead-chlor-arsenate, and vanadinite a lead-chlor-vanadate. The formulas are identical even to the small subscript numbers except for the respective substitution of phosphorus, arsenic, and vanadium. There are many other interesting series due, like this example, to the isomorphous replacement of elements with similar properties.

Another feature of this type of collection should perhaps be mentioned and that is the ease with which a special exhibit can be arranged for classes or club meetings. A glass-topped tray about the size of an atlas can be used for the exhibition of smaller sub-collections pulled out of the larger collection. In this way may be shown collections of copper minerals, zinc minerals, crystals, twins, pseudomorphs, the minerals of Arizona or Norway or Franklin, just to cite some examples.

So compact is the collection that it can be held in its entirety in a single piece of furniture, a chest of a dozen shallow drawers. Plans are being made for a new, larger cabinet with smaller and more numerous drawers for greater ease in separating the Dana groups and also with built-in file drawers for the card index. On top of the cabinet there will be room for the most useful books from the writer's mineralogical library and the latest copies of the mineralogical journals. The value of such a unit to a mineralogist can readily be appreciated and the writer hopes that some of his readers may be tempted to start reference collections of their own, as more than a score of his former students have done in the past few years.

WORLD'S FINEST FLOS-FERRI COMES FROM AUSTRIA

At Eisenerz, a village in the province of Styria in the eastern part of Austria, a celebrated deposit of siderite is worked. Siderite is iron carbonate and the ore at Eisenerz averages 39% iron; in normal times about 2,000,000 tons are mined annually from huge open cuts.

From the collector's standpoint, Eisenerz is noted for its fine coralloidal aragonites—the world's finest come from there. These white masses, known as flos-ferri, are found in great perfection coating cavities, pockets, and caves which often are of considerable extent in the siderite deposits. The aragonite generally coats siderite but it also is found on limonite. Once these exquisite aragonites were quite plentiful but they are now becoming rare.

Aragonite is calcium carbonate and it is believed by some mineralogists that this mineral, when in solution at Eisenerz, precipitated on cobwebs in the caves and pockets of the deposits which would account for their lacy structure.

Flos-ferri is from the Latin and means "flower of iron" because the mineral is so common in beds of iron ore.

GILPIN COUNTY, COLO., THEN AND NOW

By RAFAEL D. STOTTS
Black Hawk, Colo.

Although Gilpin County is the smallest county in the state, it is one of the most important gold producing areas in Colorado. The first veins carrying gold in the state was discovered by John F. Gregory in the spring of 1859. Gregory was a native of Georgia and formerly drove ox teams across the plains. When the gold fever got him he was on his way to California but when he reached the place that is now Denver, a friendly Indian told him of gold being found in streams flowing down from the mountains. One of these streams, named Clear Creek, seemed to attract him most. He noticed a large gap in the mountains directly west and it only appeared to be about 5 miles away. One morning he took his gold pan and started out for the gap. He lost some time in panning the stream on his way so that it was late in the evening when he reached the point where the stream emerges from what is now known as the front ranges of the Continental Divide. He now saw the need of a pack horse or a burro or both to carry his supplies as he found the distance back to camp was more than a half-day's walk.

He secured some pack animals and within a week was cutting his way through timber and thick vegetation into Clear Creek Canyon; as near as I can learn this was in the fall of 1858. Each pan of gravel that he sampled looked better and better but winter was approaching so that further prospecting had to be abandoned. Where he spent that winter we do not know but he returned early in the spring of 1859. He met a man named Jackson who became his partner and they began carving out a trail up the canyon. It took them several weeks to do this, a distance of 13 miles, and when they reached a tributary coming in from the northwest (now known as North Clear Creek), they parted. Gregory had suggested that they follow the smaller stream but Jackson said, "You go your way and I'll go mine".

Gregory followed up the smaller stream for a distance of 7 miles, panning all the way when on May 6, 1859, he discovered the first gold vein in Colorado. This discovery was made about halfway between Black Hawk and Central City. At this point there now stands a fine monument bearing a copper plate which tells the story of the first gold discovery in Colorado. Four or five other veins, nearly as rich, were found nearby and this is why the area has been rightfully called "the richest square mile on earth". It is reported that Gregory received only $2,500 for his mine which produced $85,000,000. Gold at that time was worth only $20.67 per ounce; now it is worth $35.00 per ounce.

Here are now three ghost towns in a row, Black Hawk, Central City, and Nevadaville which in the good old days when the mines were in operation had a combined population of about 20,000. The total population of the three towns is now about 1,500. The old mining town of Apex is 7 miles to the north of Black Hawk and Russell Gulch is 4 miles to the south. Black Hawk is on the famous Peak to Peak Highway which is as smooth and hard as any city street—a 45 minute drive from Denver.

I remember riding on a Denver street car, called the "Seeing Denver" car, which carried a lecturer who pointed out spots of interest and talked briefly on each. Once he pointed in the direction of Central City and said, "There is the back bone of the United States and Gilpin County was the back bone of the U. S. Treasury during the Civil War."

There are many theories as to the source of gold but I agree with an astronomer who, before his death, was a columnist on a Denver daily newspaper. He believed that there are cubic miles of solid gold way down inside the earth and that the great upheavals that made the

Rocky Mountains brought quantities of gold to the surface.

It is told of a prospector who was driving a hard rock tunnel that when his grub and blasting material was running low he approached a former U. S. Senator for a loan of $40 as a grub stake saying that he was within 3 feet of a million dollars. He got the loan. Months passed. One day the two met on the street and the senator asked him about the $40 loan saying "You told me you were within 3 feet of a million dollars."

"Oh, pshaw," replied the prospector, "I'm not within a million feet of $3.00."

As to the largest silver nugget in the State, it was found several miles south west of Black Hawk at Aspen. The find was made in 1897 at a depth of 800 feet in the Mollie Gibson Mine. The weight of this nugget when found was 2,060 lbs. but it had to be trimmed in order to bring it up through the shaft. The weight was thus reduced to 1,840 lbs. It was shipped to Denver where it was exhibited at the State Capitol with a card reading, "If coined it would make 8,212 silver dollars."

The mines of this area did not close down because the ore ran out but because of poor pumping equipment. The mines were very wet and it was most difficult to pump the water out. When some of the mines closed down due to litigation or for other reason, the waters from them seeped into the others and this created such a problem that they finally all closed down pending the installment of better pumping equipment or the driving of a good drainage tunnel.

There is still enough gold left in Gilpin County to make many people rich if they will try for it and are lucky. All signs point to brisk mining activity here after the war is over!

AN EXCEPTIONALLY LARGE HIGH GRADE QUARTZ CRYSTAL

By O. IVAN LEE
Jersey City, N. J.

The smallest quartz crystals used commercially, mostly for the manufacture of quartz oscillators vital to military communications, usually average about three to a pound, and sell from three to four and a half dollars per pound for a high grade (75 to 90% useable), depending on the quality and source of supply, that is, the importer, since all these crystals are available in quantity only from Brazil.

As the size increases, however, the price per pound augments at a disproportionate rate since quartz is no exception to the rule that the larger the crystals, the more careless Nature seems to have been in growing them, and in general, it is difficult to obtain large quartz crystals of really fine quality. This accounts for the scarcity of large rock crystal spheres, for instance, and it is said that there are only six flawless six inch spheres in the United States.

The rule has its exceptions, though, for in March of this year a large electrical company purchased a quartz crystal in New York estimated as being 80 to 90% useable which weighed 110 pounds, the price being $58 per pound or $6,380. In fact, the quality was so good that it could have been sold for optical purposes at $70 per pound or $7,700, the specifications for use in this field being more stringent. Accordingly, this exceptional crystal is being reserved for very special purposes since it is far too good to sacrifice for oscillators for which smaller and less expensive crystals can serve.

When one considers that the huge and partially gemmy white topaz crystal weighing 595 pounds, and a featured exhibit in the hall of minerals at The American Museum of Natural History, New York City, cost some $5,000, it is hoped that the mineralogist and collector will hold quartz in somewhat more respect than is not infrequently the case with our commonest species.

THE CALVERT COLLECTION

(As seen by Martin L. Ehrmann)

By JOHN C. POHL, JR.

One of the greatest of all mineral collectors was John Calvert, an Englishman. He was born at the beginning of the nineteenth century in St. Winnous, near the banks of Fouer, in Cornwall, England, where his father had been born before him.

John Calvert was a man of most peculiar temperment—a crank we might call him were he alive today. Though he purchased many famous collections entire, no specimens were ever known to have been donated to a museum, university, or other worthy institution—nor were any placed on display, not even in his own home. Every specimen would be wrapped up and stored away, as a miser hoards his gold. It has been said that he took keen delight in outbidding at auctions the British Museum—a most unpardonable sin—which brought him considerable ill will from fellow collectors because they knew that specimens obtained by him would never be seen again but stored away for his selfish gratification of possession.

The Calvert Collection had its start in the middle of the seventeenth century by Lady Anne Arundel, wife of Cecelius Calvert, second Lord Baltimore, and the first governor of Maryland, U. S. A. Lady Anne's collection consisted of some minerals and shells. This collection was later acquired by John Calvert and to it were added the famous collections of Lord Baltimore, Mr. Mayatt, Mr. Heuland, Mr. Sheraton, Sir P. H. Rashleigh, Mr. Norris, and Mr. Reeve.

The Calvert Collection was one of the greatest mineral collections ever made—known better in England, of course, than in America. It contained thousands and thousands of specimens—no one ever knew the exact number—perhaps not John Calvert, himself. What happened to it finally? Did the British Museum acquire it? Was it purchased by some wealthy English collector? Or donated to some English university, No! No! and No! An American mineral and gem dealer, Mr. Martin L. Ehrmann, of New York City (a member of the Rocks and Minerals Association), purchased it, brought it over to America, and placed the entire collection on sale in his Radio City (New York City) offices and display rooms. Specimens from this most remarkable collection have been acquired by the most prominent collectors in the country and especialy those residing in the East.

How did Mr. Ehrmann happened to purchase this great collection? He was asked this question and here is his reply:

"I was in England during the summer of 1938 to buy my usual stock of minerals and gems when I heard of the famous John Calvert Collection being for sale. It naturally interested me and I made inquiries and soon contacted the agent who told me the history of the collection and gave me a copy of a general survey with some notes upon its principal features. This only added to my interest and I wanted to see the minerals, so we set out to do this.

"We arrived in a northwest suburb of London where the collection was housed in a three-story brick store-house. I felt like the traveler in the Arabian Nights story about to enter the cave of hidden gems when we entered the building. For here I saw hundreds of cases and cabinets crammed to their utmost capacity with specimens representing almost every branch of science. Many of the specimens had been flung pell-mell upon the floor and even piled to the ceiling in amazing disorder. It was the plunder of years of hoarded treasures of a collector who knew their worth! All were covered with two to three inches of London's dust and grime for the building had not been opened for many years.

"I picked up a specimen at random that appeared to be crystallized but heavily coated with dust. I asked for a water tap to wash it but was told there

was none in the building. A cobbler's shop was next door and there I went to wash the specimen. The beauty of the washed specimen so amazed me that on the strength of this one specimen alone I then and there decided to buy the collection. I will truthfully say that I was not prompted to make the purchase for financial motives. I wanted my fellow countrymen to share my pleasure of seeing this remarkable collection. No financial return could ever repay me for the arduous task of packing and transporting this huge accumulation of specimens to New York, unpacking and arranging for sale.

"Then began the most difficult task of packing the specimens, many of which were fragile, for shipment to America. Smocks and gloves were purchased and worn but after each day's work I looked so dirty and disheveled, like a coal miner, that I was ashamed to enter the hotel.

"Packers were hired—then the great collection began to move in drays toward the ship that would take it to America. When the last box had been stored safely away in the ship's hold, I breathed a sigh of deep relief, turned around slowly and headed for the hotel for a good clean-up and rest.

"Collectors have often asked me if I ever felt worried after making my decision to purchase the collection and over its final disposition. Well, after a hard day's work in packing, I frequently became depressed. Inhaling the dust, day after day, would make the healthiest man sick. However, after the collection was safely on its way to America and I, too, was on my way home breathing the fresh sea air, I became most cheerful in visualizing the joys of American collectors when they would see the long buried treasures and have the privilege of purchasing individual specimens at most reasonable prices. I consider placing this remarkable collection in the hands of my fellow Americans the greatest joy of my life.

"My offices became the mecca of famous collectors from all over the United States. Many friendships were formed and in this I feel amply repaid for my part in the work."

Editor's Note: Mr. Ehrmann's offices have been closed for the duration as he is now in the armed service of our country—a major in the U. S. Army.

Some of the finest specimens from the Calvert Collection now repose in the collection of Mr. John C. Pohl, Jr., of Easton, Penn.

BROWN COLLECTION DONATED TO HIGH SCHOOL

The noted mineral collection of Mr. Will L. Brown, of Modesto, Calif., has been donated to the Modesto High School at which he has been a teacher in chemistry for many years. The collection, which numbers over 2,000 classified and cataloged specimens, is a general one but embraces many large, beautiful and rare items. The minerals came from the four corners of the world and many were personally collected by Mr. Brown.

Mr. Brown began the collection nearly 50 years ago while doing some engineering work in the Mojave desert of his state. He ran across some interesting minerals which so intrigued him that then and there he began to make a collection of them.

Room 4 at the high school has been turned into a museum in which the collection is now housed and on display. On a table near the door is a large gilt plaque bearing the words:

> The
> WILL L. BROWN
> MEMORIAL
> Mineral Collection

Mr. Brown is and has been a member of the Rocks and Minerals Association since May, 1931.

Clubs Affiliated With the Rocks and Minerals Association

ARIZONA

Mineralogical Society of Arizona
Geo. G. McKhann, Sec., 909 E. Willetta Street, Phoenix.
Meets at the Arizona Museum in Phoenix on the 1st and 3rd Thursday of each month.

CALIFORNIA

East Bay Mineral Society
Miss Ida Chittock, Sec., 1012 Elbert St., Oakland.
Meets on the 1st and 3rd Thursdays of each month (except July and August), at 8:00 p.m., in the Lincoln School Auditorium, 11th and Jackson Sts., Oakland.

Northern California Mineral Society, Inc.
Mrs. Bernice V. Smith, Sec., 1091 Bush St., San Francisco.
Meets on the 3rd Wednesday of the month at the Public Library, San Francisco, at 8:00 p.m.

Pacific Mineral Society
Margaret Cotton, Sec., 2129—9th Ave., Los Angeles.
Meets on the 2nd Friday of each month at 6:30 p.m., at the Hershey Arms Hotel, 2600 Wilshire Blvd., Los Angeles.

Southwest Mineralogists
Dorothy C. Craig, Corres. Sec., 4139 S. Van Ness Ave., Los Angeles.
Meets every Friday at 8:00 p.m., Harvard Playground, 6120 Denker Ave., Los Angeles.

COLORADO

Canon City Geology Club
F. C. Kessler, Sec., 1020 Macon Ave., Canon City.
Meets on the 1st and 2nd Saturdays of each month at 9:00 a.m. in the High School Building, Canon City.

CONNECTICUT

Bridgeport Mineral Club
Miss Georgianna Seward, Sec., 2859 Main St., Bridgeport.
Meets in the Bridgeport Public Library on the 3rd Monday of the month.

Mineralogical Club of Hartford
Miss Gladys L. Gage, Secretary, 239 Newbury St., Hartford.
Meets the 2nd Wednesday of each month, at 8:00 p.m., at 249 High St., Hartford.

New Haven Mineral Club
Mrs. Lillian M. Otersen, Sec., 16 Grove Place, West Haven.
Meets on the 2nd Monday of the month at the Y. W. C. A. on Howe St., New Haven.

IDAHO—OREGON

Snake River Gem Club
Frank S Zimmerman, Sec., Payette, Idaho.
Meets alternately in Payette, Idaho, and Ontario, Oregon, (two small cities on the Snake River) on the 3rd Tuesday of every month.

ILLINOIS

Junior Mineral League
William Dacus, Sec., Morgan Park Junior College, 2153 W. 111th St., Chicago.

MAINE

Maine Mineralogical and Geological Society
Miss Jessie L. Beach, Sec., 6 Allen Avenue, Portland.
Meets last Friday of the month at 8 p.m., at the Northeastern Business College, 97 Danforth Street, Portland.

MASSACHUSETTS

Boston Mineral Club
Miss M. Gertrude Peet, Sec., 8 Willard St., Cambridge.
Meets on the 1st Tuesday of the month at 8:00 p.m., at the New England Museum of Natural History, 234 Berkeley St., Boston.

Connecticut Valley Mineral Club
Mary E. Flahive, Secretary, 96 South St., Florence.
Meets on the 1st Tuesday of each month at 8 p.m. at various institutions in the Connecticut Valley.

MISSOURI

National Geological Club
Mrs. D. P. Stockwell, Pres., Mt. Olympus, Kimmswick.

NEVADA

Reno Rocks and Minerals Study Club
Mrs. Rader L. Thompson, Sec., Box 349, R2, Reno.
Meets on the 1st Wednesday of each month, at 7:30 p.m., at the Mackay School of Mines, Reno.

NEW JERSEY

Newark Mineralogical Society
Louis Reamer, Secretary, 336 Elizabeth St., Orange.
Meets on the 1st Sunday of the month at 3 p.m. at Junior Hall, corner Orange and North 6th Streets, Newark.

New Jersey Mineralogical Society
G. R. Stilwell, Sec., 1023 W. 5th St., Plainfield.
Meets on the 1st Tuesday of the month at 8 p.m. at the Plainfield Public Library.

NEW MEXICO

New Mexico Mineral Society
R. M. Burnet, Sec.-Treas., Carlsbad.

Society of Archaeology, History and Art
Carlsbad.

NEW YORK

Chislers, The
Miss Evelyn Waite, Sponsor, 242 Scarsdale Road, Crestwood, Tuckahoe.

Queens Mineral Society
Mrs. Edward J. Marcin, Sec., 46-30—190th Street, Flushing.
Meets on the 1st Thursday of the month at 8 p.m. at 8501—118th St., Richmond Hill.

Rocks and Minerals Club of Nyack
Miss Ellen Lewin, Sec., c/o Dr. H. V. Krutz, 100 S. Broadway, Nyack.
Meets every Friday afternoon (except during summer) at 3:30 p.m. in the high school science room.

PENNSYLVANIA

Thomas Rock and Mineral Club
Mrs. W. Hersey Thomas, Pres., 145 East Gorgas Lane, Mt. Airy, Philadelphia.
Meets on the 3rd Friday of each month, at 8:00 p.m., at the home of its president, Mrs. Thomas.

VERMONT

Mineralogical Society of Springfield
Victor T. Johnson, Sec., 11 Elm Terrace, Springfield.
Meets on the 3rd Wednesday of each month at 8:00 p.m. at the homes of members.

WISCONSIN

Wisconsin Geological Society
Mrs. J. O. Montague, Sec., 1026 E. Pleasant St., Milwaukee.
Meets on the 1st Monday of each month at 8:00 p.m., at the Public Museum in Milwaukee.

SOUTHERN CALIFORNIA LOCALITIES

By JACK SCHWARTZ

656 South Hendricks Ave., Los Angeles, Calif.

10. Redondo Beach and Palos Verdes Estates

Palos Verdes Estates adjoins Redondo Beach which is in Los Angeles County. It is about twenty miles from the city of Los Angeles, and a few miles from Long Beach.

Redondo Beach is the scene of many tourists, who usually, in rough weather, wade barefooted in the surf to find the much sought for moonstone. However none of these ambitious individuals are rock collectors, for anyone knowing just a mite about mineralogy would at the first "find" realize that the precious moonstones are but bits of chalcedony, rounded and polished by the ocean. Very rarely a piece is found that contains agate or sagenite good enough to cut into a gem. However, the ordinary pieces of chalcedony do take a fine polish, thus attracting thousands of eager-eyed humans, old and young, who accumulate these specimens with pride. Common pieces of jasper are also washed up by the waves. Many an individual has a jar filled with these pebbles, dunked in water, indeed a rare collection to them.

South along the beach, the sharp-eyed mineralogist will find smooth, washed up pieces of triboluminescent quartz. These water-worn stones, when struck against each other in a dark room, will show the effect of "lighting up," especially when the rubbing or striking is continuous.

Farther south is the Palos Verdes Estates. Here numerous specimens of beautiful crystals of barite are taken. The barite occurs as seams and outcroppings in the rocks in the sea cliffs. Nearly every Southern California collector has a choice group of these crystals. The author, with Mr. Sydney Dennis and Mr. Arnold Mallis, was fortunate enough to collect perfect specimens of both small and large crystals on the matrix. Some solid specimens of barite were also taken. Tiny dolomite crystals were found covering the rock matrix.

Club and Society Notes

Mineralogical Society of Arizona

On the evening of June 29th, 1943, the Mineralogical Society of Arizona, at a special meeting held on the lawn of the Arizona Museum in Phoenix, enjoyed an unusual treat and scored a "scoop". At this meeting Dr. Frederick H. Pough, of the American Museum of Natural History, of New York City, gave the first lecture to be heard in the United States on the very latest development in the realm of geology—that infant but fast growing volcano, Paricutin, in Michoacan, Mexico. Dr. Pough had just returned from the volcano, where he spent some time making valuable observations, and brought a first hand record of phenomena never before recorded, which he summarized in a most interesting manner. It is indeed unfortunate that Nature should stage such a spectacle at a time when so few can be present to make accurate observations from day to day. Such data, collected in detail by a number of independent observers, would constitute a valuable addition to our knowledge of vulcanism.

Dr. Pough spent four busy days with society members before resuming his homeward journey.

A regular summer, out-of-doors social meeting was held July 8th at the home of Vice-President Luther Steward. For the particular benefit of those who could not be present to hear Dr. Pough on June 29th, a further discussion of the volcano Paricutin was held.

Newark Mineralogical Society

The Newark Mineralogical Society is making a collection of cabinet-size photos of all members, past, present and future. A plush album has been presented to the Society by the President, Wm. H. Broadwell. The Society wants, first of all, photos of its Founders and Charter Members, then all the newer members. These photos are to be sent to Pres. Wm. H. Broadwell, 96 Fabyan Place, Newark, N. J.

East Bay Mineral Society

At the meeting of May 29, 1943, the East Bay Mineral Society elected the following officers for the coming year:

President: George Higson
Vice-Pres.: R. E. Lamberson
Treasurer: F. W. Cochran
Secretary: Miss Ida Chittock
Directors: J. Lewis Renton
F. M. Osborn
W. C. LaRue
Ida Chittock, Sec'y.

Wisconsin Geological Society

At the June meeting of the Wisconsin Geological Society the following officers were elected for the year 1943-44:

President: Joseph Vukovich
Vice-Pres.: Paul C. Ziemke
Secy.-Treas.: Mrs. J. O. Montague
Board of Directors: Ted Wiseman
Gordon Boudreau
Elmer Nelson
Oliver Lex
Mrs. J. O. Montague, Sec.

With Our Dealers

Warner & Grieger, of Pasadena, Calif., are featuring this month a new gem stock—Australian opal imbedded in lucite (a transparent, colorless, artificial product). If anything new in the gem line is to come out, Warner & Grieger will announce it.

J. Gisler & Son, of San Francisco, Calif., are with us again. Collectors will surely be tempted by their beautiful tourmalines and garnets—who can resist them?

West Coast Mineral Co., of La Habra, Calif., are also with us again and their advertisement features some collectors specials. Since the items offered are *specials*, we will not say anymore about them except to advise you to look the ad up.

Jno. B. Litsey, of Dallas, Texas, has a stock of very nice fluorescent minerals and this month he is featuring five varieties—hackmanite, willemite, fluorite, calcite, and opal. Have you these specimens?

In their ad in this month's issue of ROCKS AND MINERALS, Ward's Natural Science Est., Inc., of Rochester, N. Y., recommend 10 specimens because of their desirability. What may the specimens be? Don't ask—look them up for yourself!

Chuck & Rocky, of Los Angeles, Calif., after a ten months absence, are with us again. They are starting off their advertising with a number of attractive specimens. Look their ad up!

Questions and Answers

Ques. "What are fairy stones? Are they really minerals?" T. K., Topeka, Kans.

Ans. *This is a term applied to staurolite crystals when found in the form of a cross. Staurolite is a mineral and the most common locality for fairy stones is Patrick County, Virginia.*

Ques. "Is there such a thing as a paint mine? I have heard this expression used somewhere and would like to know what it really means." R. E. R., Zanesville, Ohio.

Ans. *Yes, there is. Low grade iron ores and other minerals used in the manufacture of paint are often mined exclusively for this purpose—hence the workings are called "paint" mines.*

Ques. "I have a nice specimen of polished gray granite labelled as coming from Stone Mt. Can you tell me where this locality might be?" A. A., Freeport, N. Y.

Ans. *Stone Mountain is a little village or hamlet about 16 miles northeast of Atlanta, Ga., in which there are about ½ dozen or more granite quarries of which 2 or 3 are at the base of a huge granite dome "Stone Mountain" which gave its name to the hamlet. The huge bare granite dome towers 686 feet above the surrounding terrain and has a basal circumference of about 7 miles. Your specimen comes from one of the quarries at the locality.*

Ques. "Is tin ore found in the United States?" A. J., St. Louis, Mo.

Ans. *Cassiterite, the chief ore of tin, is a common mineral in many parts of the United States but it is not found in deposits large enough to make tin mining really profitable. Cassiterite is found in Maine, Virginia, North and South Carolina, South Dakota, Washington, and in a number of other states.*

Bibliographical Notes

The Mining Industry of the Province of Quebec:

The total value of the products of the mines and quarries of the Province of Quebec in 1941 was $99,700,027. This is a new record and is more than 16% above that established in 1940. Each year since 1932 the value of the mineral production of the Province has shown an increase.

The report contains 104 pages, 4 plates, and is divided into three parts—metals, non-metals, and building materials.

Issued by the Bureau of Mines, Quebec, Que., Canada.

Journal of the Barbadoes Museum and Historical Society:

In the February, 1943, issue (Vol. X, No. 2) of the Journal appears a most interesting article on manjak, a peculiar asphalt found in Barbadoes. The article is by R. H. Emtage and it covers the nature of the substance, its origin and properties (pp. 56-60).

Other articles in this interesting Journal are: "Productivity of the Seas" (pp. 45-55); "The Lucas Manuscript Volumes in the Barbadoes Public Library" (pp. 61-73); "Turners Hall Wood" (pp. 74-84); "Extracts from *The Barbadian* Newspaper" (pp. 85-90); and "Proceedings of the Barbadoes Museum and Historical Society" (pp. 91-99).

The Journal is priced at 4/ (about $1.00) per copy and can be obtained from the Barbadoes Museum & Historical Society, St. Ann's Garrison, Barbadoes, B. W. I.

Michigan Geology Progress Bibliography. Part V. By Duncan Stewart, Jr.

A 22-page bibliography on the geology and mineralogy of Michigan. The authors are listed alphabetically but are grouped according to the publications in which their articles were printed. ROCKS AND MINERALS has 4 listings.

Issued by the Department of Geology and Geography, Michigan State College, East Lansing, Mich.

R. & M. A. HONOR ROLL

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The following members of the Rocks and Minerals Association are in the armed service of our country. Of the 67 members listed, one is a girl, Miss Eleanor Wales, of Auburndale, Mass. If any errors or omissions occur, please call them to our attention. We would also appreciate if members would notify us of their change in rank, etc., so that they may be properly listed.

Though some members are on foreign soil, the Association has suffered no casualties as far as is known.

Albancse, John S. (Navy), Newark, N. J.
Axtell, R. J. (Col., Army), Indianapolis, Ind.
Bagrowski, B. P. (Corp., Army), Milwaukee, Wisc.
Bennett, A. E. (1st Lt., Marines), Freehold, N. J.
Bingham, Wm. (Capt., Army), St. Paul, Minn.
Birman, Joseph (Pvt., Army), Seekonk, Mass.
Bondley, Charles J., Jr. (Lt. Col., Army), ...?
Brixey, Austin Day, Jr. (Navy), New York, N. Y.
Brown, J. Prescott (Maj., Army), Albany, N. Y.
Campbell, Clyde (Pvt., Army), Harrison, Ohio
Cilen, Anthony (Pvt., Army), Hawthorne, N. J.
Cilen, Joseph (Pvt., Army), Hawthorne, N. J.
Connor, J. H. (Navy), Atlanta, Ga.
Crowley, Richard M. (Army), Philadelphia, Pa.
Currier, Frederick, Jr. (Pvt., Army), Meredith, N. H.
Dailey, T. C. (Pvt., Army), Dayton, Ohio.
Ehrmann, M. L. (Maj., Army), New York, N. Y.
Fine, Sidney A. (Corp., Army) .....?
Gilchrest, J. R. (Lt., Navy), Nyack, N. Y.
Glasser, Frank (Sgt. Army), Gray, Idaho
Graham, D. P, Jr. (Pvt., Army), Silver Spring, Md.
Grieger, John M. (Pvt., Army), Pasadena, Calif.
Hatcher, J. S. (Brig Gen., Army), Falls Church, Va.
Irvin, A. M. (Army), Dexter, Maine
Jelinek, Joseph K. (Pvt., Army), Pasadena, Calif.
Jenni, Clarence M. (Maj, Army), Festus, Mo.
Johl, Max G. (Maj., Army), Groton, Conn.
Kerridge, P. M. (Lt., Navy), Washington, D. C.
Kessler, Dr. Frank (Army), Peekskill, N. Y.
Knox, Arthur S. (Army), W. Somerville, Mass.
Knox, S. C. (Pvt., Army), Atlanta, Ga.
Kobelt, Theodore W. (Army), Wallkill, N. Y.
Komiakoff, Leo (Lt., Army), Poughkeepsie, N. Y.
Livingston, John L. (Capt., Army), Elizabethtown, Ill.
McKeen, J. R. (Navy), Stratford, Conn.
McKinley, Wm. C. (Army), Peoria, Ill.
Mercer, L. P. (Navy), Boulder City, Nev.
Minor, W. C. (Army), Fruita, Colo.
Mixon, Carol (Pvt., Army), Lawrence, Mass.
Molnar, George (Sgt., Army), Perth Amboy, N. J.
Muir, A., Jr. (Corp., Army), Scotch Plains, N. J.
Newell, Jno. G. (Pvt., Army), Wilson, N. C.
Ofstein, A. H. (Pvt., Army), Mattapan, Mass.
Pancoast, B. S. (Sgt., Army), Woodstown, N. J.
Pearl, Richard M. (Corp., Army), Denver, Colo.
Perkins, James M. (Pvt., Army), Bridgeport, Conn.
Printz, W. Harold (Pvt., Army), Newport, Ore.
Pugsley, Ken (Pvt., Army), Pawling, N. Y.
Randolph, Jack H. (Sgt., Army), ...?
Raynolds, Dr. A. H. (Army), New York, N. Y.
Rhoades, F. S. (Sgt., Army), New York, N. Y.
Sawyer, John A. (Maj., Army), Manhattan, Kans.
Shaub, B. M. (Maj., Army), Northampton, Mass.
Shinkle, J. C. (Lt. Col., Army), Aberdeen, Md.
Smith, T. L. H. (Pvt., Army), Danbury, Conn.
Sober, Harry (Ens., Navy), Washington, D. C.
Spawn, Willman (Pvt., Army), Washington, D. C.
Stinger, Ed. (Army), ...?
Straley, Arthur (Navy), ...?
Tasman, H. G. (Navy), Nyack, N. Y.
Thompson, Norman (Corp., Army), Chico, Calif.
Wales, Miss Eleanor (Lt., WAACS), Auburndale, Mass.
Watters, Lu (Navy), San Francisco, Calif.
Weight, Harold O. (Sgt., Army), ...?
Wildzunas, John (Corp., Army), Albany, N. Y.
Yaeckel, M. P. (Navy), Claremont, Calif.
Yedlin, Leo Neal (Army), Cedar Grove, Me.

Lloyd McFarling has been released from active duty in the army and has returned to his home in Lincoln, Nebr. He is the first member known to us to have been released from active service.

TRAINER BUYS GARNET COLLECTION

John N. Trainer, of New York City, recently purchased the entire garnet collection from the family of the late Harry Warford, of Philadelphia, Pa., who died last January.

The collection contains over 800 catalogued items represented by over 400 localities.

The collection has been sent to Mr. Trainer's summer home in Brewster, N. Y., where he is now having a grand time in laying out, sorting, and incorporating the new specimens into his own collection.

Mr. Trainer, who has been specializing in Tilly Foster minerals, has lately become fascinated by garnets and is now centering his attention on them. Without any question of a doubt, he now possesses the largest and finest collection of garnets in the country, if not in the world.

Mr. Trainer is a past president of the New York Mineralogical Club and a member of the Rocks and Minerals Association.